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OFFICIAL PROCEEDINGS
Meeting of September, 1921

Volume XX
No. - - - 6

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INCORPORATED OCTOBER 1913

Canadian Railway Club

MONTREAL

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CONTENTS

Report of September Meeting and paper and discussion on "Train Despatching by Telegraph versus Telephone."
also
List of Subjects discussed by all Railway Clubs, 1920-21.

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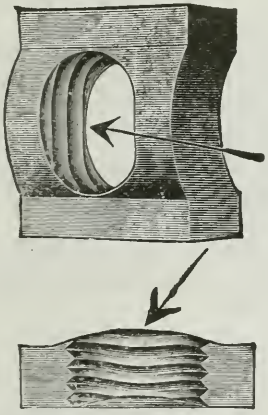

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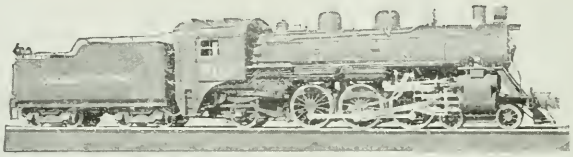

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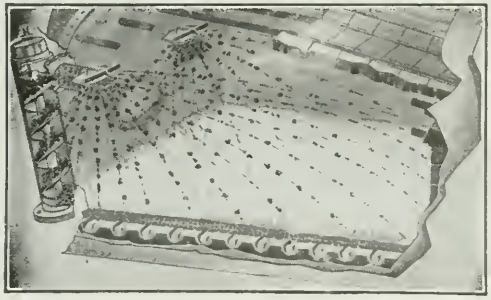

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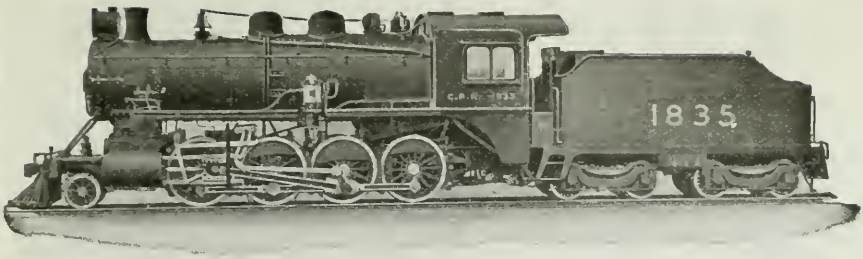

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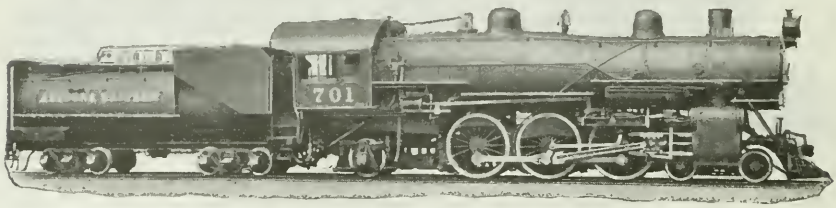

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Vol. XX. No. 6 **Montreal, Can., Sept. 13, 1921** 25c. per copy

PROCEEDING OF THE CANADIAN RAILWAY CLUB.

Windsor Hotel, Montreal,

September 13th, 1921.

Chairman (Mr. A Crumpton).—

Gentlemen, will you kindly sign the attendance cards which you will find on the chairs, so that the Secretary will have a correct record.

The minutes of the last meeting have already been mailed to all.

Our Club, thanks to the efforts of the President, Executive Committee and Members last year, now has a membership of 1385, which is only exceeded by that of the New York Club. This year we aim to be the largest club on the continent, and to accomplish this, each member of the club is on the Membership Committee. Application blanks will be enclosed with the proceedings of this meeting, and I am sure you will make use of them that we will "go over the top" before the end of the year.

Members Present.

Crumpton, A.
Allan, T. A.
Anderson, J.
Bannerman, W H.
Beaulieu, D.
Bergen, Frank
Blumenthal, S.
Bogart, A. L.
Boyd, Geo.
Branston, Wm.
Britton, J. A.
Brooks, Leland.
Brydes, A. E.
Buckland, A. W.
Burns, Claude.
Burns, E. W.
Burns, W. J.
Cameron, H. D
Camp, W. J.
Clilton, A. T.
Comley, W. T.
Cookman, R. C.
Crawford, R.
Crockett, W. B.
Crosdale, R.
Crutchlow, Geo.
Desljeres, R.
Duggan, H. V.
Eaton, John.
Fielding, W. G.
Goodenough, A J.
Hampshire, A.

Hanson, L. J.
Harold, L.
arrigan, H. C.
arrison, J.
Hawes, W. T.
Hay, Jas.
Hobbs, W. H.
Holland, F. E.
Holland, Norman.
Hendry, John.
Hulatt, H
Huntre, P. S.
Hunter, W. C.
Hyman, W. J.
Inns, G. A.
Kendall, A. H.
Kell, G. A.
Kelly, E. J.
Lathrop, C.
Lecavalier, A.
Loudon, A. C
Ludington, W. H.
Mackie, R. L. D.
Masse, D.
Matheson, A. G.
Menard, J. P.
Miller, M. J.
Mimms, A. E.
Mimms, Thos.
Mullaly, M. J.
Murray, F. T.
Murray, W B.
McAllister, W. J
McCormick, J. A.
McKinney, H.
MacVicar, Robt.
Naylor, H. R.
Palme, J. E.
Parsley, W. H.
Peat, A. N.
Pierpont, F. H.
Pope, A.
Primeau, J. L.
Riddington, A.
Robb, G W.
Robb. J. D.
Robertson A S. Jr.
Rogers, W B.
Rosevear. W. H.
Ross, J. D.
Simpson, J Sr
Simpson, J. A. Jr.
Sleigh, T.
Spalding, E. C.
Stacey, F. H.
Stewart, W. H.
Summers, A D.
Symmes, H. H.
Thorburn, C. D.
Thorp, H. W.
Tillett. C. H.
Tilt, E. B.
Tinkler, C.
Tourville, M.
Towne, S. C.
Viberg, E. R.
Whitcomb, F. E.
Whitcomb. F. O.
Wilson, G. M.
Wilson, H. A.
Wyer, F. H.
Yost, W. H.
Booth, W. A.
and many others.

The Secretary then read the list of applications for membership, which were formally approved and accepted by the meeting, and are as follows:

New Members.

Tom A. Allen, Chief Signal Inspector, G. T. R., Montreal

James M. Brown, District Manager, Liberty Steel Products, Boston.
R. Deslieres, Asst. Foreman, Angus Shops, C. P. R., Montreal
R. G. Griffiths, Agent & Importer, Vickers Ltd. of London, England, Montreal.
Robt. H. Gwaltney, T. H. Symington Co., New York, N. Y.
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J. E. White, Foreman, Air Brake, Tool & Brass Depts., C.N.R. St. Malo, Quebec.
H. A. Wilson, Associate Editor, "Canadian Machinery," MacLean Publishing Company, Montreal.

Mr. W. J. Camp, Assistant Manager, Canadian Pacific Railway Telegraphs, Montreal was then introduced to the meeting and read a paper on Train despatching by Telegraph versus Telephone.

TRAIN DESPATCHING BY TELEGRAPH VERSUS TELEPHONE.

A brief resume of a portion of telegraphic history might be a suitable introduction to this paper.

The word "Telegraph" strictly defined means, "To write afar off," and in the most remote times various methods were employed for communicating intelligence to a distance such as signal fires, waving of tree branches, etc. The ancient Greeks erected towers on hilltops and had an ingenious arrangement of water in a tube alongside of a scale showing the letters of the alphabet. The letter to be transmitted was indicated by raising or lowering the surface of the water or liquid.

Towards the latter part of the 18th century the semaphore system of telegraph was introduced, the term semaphore signifying "A sign I bear." Numerous other systems were employed at various periods, but time will not permit detailed mention.

An electric telegraph was constructed by Lesage, of Geneva, consisting of 24 wires (one for each letter of the alphabet) there being but 24 letters in the language of that country. I have not the date, but about 1815 an alphabetical telegraph was invented by Ronalds, which consisted of a dial at each end operated by clockwork in unison. As the letter appeared in a slot an electrical impulse was sent over the wire. Of course, should the dials not be revolving in unison the message would be unintelligible. In 1839 a system requiring 10 wires was devised by de Hee, the receiving operator detecting the signal by a shock through his thumb and finger coming in contact with the proper pair of wires. Many discoveries were made regarding electric batteries and apparatus for various purposes between 1774 and 1837. In the latter year Morse invented the electric telegraph on the principle now generally used. His first receiver weighed over 300 lbs., and when he succeeded in making a relay that only weighed 75 lbs., it was thought that the height of improvement had been reached. Compare this with the telegraph relay now in general use, which weighs three pounds, and this miniature instrument which I have actually used, weighed only 1 3-5 ounces.

The first telegraph line on this continent was between Washington, D.C., and Baltimore, M.D., and the first telegram over this line read as follows: "What hath God wrought?" The signals were embossed on a paper tape by the electric receiver. But, in a comparatively short time, telegraph operators discovered that they could read the signals by sound. This practice was, however, prohibited by the different telegraph companies for some years, until it was found that receiving by sound was far more rapid than by tape and that there were actually less errors, and sound reading is now universal except for very high speed automatic, and the printing telegraph.

The automatic, or high speed telegraph is only suitable for use between points where there is a very heavy traffic. Briefly described, it is a system in which operators punch combinations of holes in a paper tape. This tape is fed into a transmitter which forwards the signals over the wire at a high speed. The signals are received on a paper tape and the tape transcribed on telegram forms. This system is employed by the British Pacific Cable Board on a wire leased from the Canadian Pacific Railway between Halifax, N.S., and Bamfield on the south west coast of Vancouver Island, B.C., where the cable system from Australia ends, a total distance of 4,004 miles. The circuit is worked duplex (i.e., in both directions simultaneously) and is, I believe, the longest commercial telegraph circuit in the world.

On through traffic between Australia and Great Britain the telegram is not written out at any point. For example: The cable operator in Australia punches a tape with an apparatus having a keyboard similar to a typewriter. The receiving tape at the first relay station is gummed on a blank and the sending operator on the next section repunches another transmitting tape from the received one, and so on to London, where the receiving apparatus is arranged to punch holes somewhat similar to the transmitting tape. This tape is then fed into a typewriter combination and automatically typed. The message from start to finish not being written out.

On the Cable sections, the receiving tape shows a wavy line, but on the land sections, marks dots and dashes. Here are some specimens of the land line section showing the receiving tape at different speeds, 75, 175, 260, 422 and 624 letters per minute. The regular average is 125 letters per minute. The latter is the highest speed for which the apparatus here is arranged. The highest speed attained on the Halifax-Bamfield circuit for perfect work is 300 letters per minute. On short press circuits in Great Britain a speed is attained of 1,500 to 2,000 (?) letters per minute, punching and transcribing being distributed amongst several operators.

Some years ago experiments were made with an automatic repeater which passed landline signals on to the cable and at the distant end to landlines again. Perfect work was performed between Bamfield, Vancouver, Victoria, B.C., and London, England, but the system is of no great practical value because the only city in Canada which has sufficient cable traffic to keep one Trans-Atlantic cable working to capacity is Montreal, and the cable traffic passing through this City is divided between several companies, the Anglo, Commercial, Western Union, Direct, and Imperial, and the Marconi Wireless. I might here mention that I understand Montreal is the largest cabling city on the American continent outside of New York.

The printing telegraph came into use in Europe somewhere about 1865. On this continent the stock "ticker" has been in use since about 1870. I have not the dates on which printers were first used in North America for general telegraph work. The first printer circuit installed on the Canadian Pacific Lines was in August 1912, between Montreal and Toronto. Printer circuits are now worked from Vancouver to Winnipeg; Winnipeg to Toronto; Winnipeg to Montreal; Montreal to Halifax; and many shorter circuits. All the circuits are worked duplex. By some printer systems as many as eight messages can be transmitted simultaneously, four in each direction.

Professor Graham Bell conceived the idea of the telephone in 1874. At that time he lived part of the year at Brantford, Ont., and the balance of the year at Boston, but his summer residence, for many years back, has been at Baddeck, Cape Breton. The first telephone message was on June 2nd, 1875, from Prof. Bell to his assistant in the next room, "Watson, come here, I want you.' The first long distance line was from Brantford, Ont., to Paris, Ont., a distance of eight miles, in August 1876.

In the early days the receiving telephone was also used as a transmitter, and it was considered a tremendous improvement when some intelligent genius conceived the idea of having two telephones connected in series, one held to the ear by one hand and the other to the mouth by the other hand.

Controlling trains by means of telegraph generally termed "Despatching" originated with Chas. Minot, Superintendent of the Erie Railroad, as mentioned in the proceedings for last season. This system rapidly spread, and in a short time practically all trains on this continent were controlled by telegraph.

Although despatching trains by telephone is generally regarded as of very recent origin it is a matter of fact that the long distance telephone was used for this purpose almost from its inception. For example: In the early eighties between the round house and station at Quebec, nearly two miles, light engines were moved on "Line clear" orders transmitted over a telephone circuit.

At the annual meeting of the Association of Railway Telegraph Superintendents in 1884, Charles Selden, Superintendent of Telegraphs of The Baltimore & Ohio Railroad, recommended the use of the telephone for train despatching, and in 1894 the same gentleman read a paper to the Association on this subject, and suggesting the methods to be followed such as spelling out the words, etc. The discussion of this paper and also of papers read in succeeding years brought out the facts that many of the railways on this continent were using the telephone to a certain extent in the handling of trains. In some cases of short terminal systems the trains were moved entirely by telephoned orders. In 1901 the Baltimore & Ohio Railroad was using the telephone for fifty-one miles.

A regular telephone train despatching circuit was not however put into service until Oct. 2nd, 1907, when the N.Y.C.R.R., opened a circuit between Albany and Fonda, forty-four miles. This section of line has four tracks. On December 11th, of the same year the Chicago, Burlington & Quincy Railroad put in operation a circuit from Aurora, forty-

six miles in length, double track. This was followed by a circuit of one hundred and six miles, single track, of the same road on March 19th, 1908. The first circuit on the Canadian Pacific Railway was opened for operation June 20th, 1908, on single track.

The nine hour law came into effect in the United States in 1907, which prevented any telegraph operator remaining on duty for a longer period than nine hours no matter how light his duties should be. This forced either the employment of an additional operator at a very large number of stations or closing such stations during a portion of the 24 hours. As there were not telegraph operators in the country to fill the places, many telegraph stations were closed for a time until telephone circuits could be installed. This condition caused many roads to adopt the telephone over parts of their systems, but perhaps the greatest factor in the development of the use of the telephone was, it was found that a far greater amount of traffic could be handled and in a much more satisfactory manner by the use of the telephone instead of the teleraph.

The following shows the miles of railway operated by the two systems at the beginning of this year:

	Operated by Telegraph.	Operated by Telephone.	Per cent by Telephone.
In the United States	133,317	122,022	47.8
In Canada:—			
Canadian Pacific Railway ..	7,031	7,522	51.7
Grand Trunk Railway	2,110	1,447	40.7
Canadian National Railway, West	3,715	2,671	41.8
Canadian National Railway, East	6,605	3,694	35.9
Michigan Central Railroad...	62	298	82.8
Pere Marquette Railroad	197	....	....
Temiskaming & N. O. Ry. ..	....	324	100.
Total on above in Canada ..	19,720	15,956	44.7

SOME COMPARISONS BETWEEN THE TWO SYSTEMS.

CALLING.

Telegraph.

Each station has a call consisting of one or two letters. This call is repeated again and again until the attention of the operator is attracted.

Sometimes the first call is sufficient, on other occasions considerable time is lost.

Telephone.

Each station is equipped with an electric bell and a selective device which only operates on a certain combination of electric impulses. By this means the despatcher can start the bell ringing at any station. As the bell only

rings when a station is wanted it is at once noticed even should the operator be on the platform or in another room.

ORDERS.

The despatcher compiles it mentally while transmitting to the several stations concerned, and writes down the order when the leading station repeats it back, then checks it off as each successive station repeats. Transmitting by telegraph is only at same speed as handwriting.

The despatcher writes the order at the same time as he able time.
is speaking into the telephone and thus gauges the speed to suit handwriting. In repeating the order back, however, each station operator speaks rapidly, thus saving consider-

INCIDENTAL COMMUNICATION.

Conversations or obtaining information slow, being practically the same as two men writing to each other all they wish to say.

As fast as a man speaks, and as a great deal of the despatcher's work consists in obtaining information another saving in time is effected.

CO-OPERATION.

On account of the slower communication, much of the personal element is absent.

Being able to speak directly to each other, more cordial relations are established between despatcher and operators, resulting in greater co-operation.

Every train is equipped with a telephone apparatus, and in case of being stalled between stations, the trainmen can get into immediate communication with the despatcher.

All communication between despatcher and trainmen must pass through a third party at slow speed.

The conductor or engine driver can get into personal contact with the despatcher and rapidly explain any difficulties encountered.

The wireless system has been experimented with to

some extent on the Delaware, Lackawana & Western Railway, principally with moving trains, but has not resulted in any practical application.

I have omitted any other reference to the wireless as I have not had time to gather data. This system has proved to be of great value in providing a means of communication with shipping and isolated points, such as Islands in the Pacific Ocean, where laying of cable is impracticable, either on account of heavy expense or unfavorable conditions in the bed of the ocean.

I have refrained from any technical description of apparatus as most of those attending the club meetings have not made a study of Electrical matters. I have also condensed this paper so that the audience would not be bored. I hope that the committee has arranged for the attendance of some who are actively engaged in train despatching, wireless telegraph, &c., and who will take part in the discussion.

In earlier days when the Canadian Pacific Railway was operating out west it was the custom to have each train include a baggageman who could telegraph. This man carried an Operator's equipment, together with spurs for climbing poles, and if the train became stalled he would climb the pole, cut the wire and get into communication with the Despatcher. At the present time, however, they simply have a pole with hooks which may be hooked on to the telephone wires, and by this means, with the telephone, the crew have immediate communication. When they are through the hooks are merely taken off and there is no necessity to cut or otherwise interfere with the wires. On some of the roads, in lieu of this they have emergency telephones located at different points along the line about four miles apart, but if the train should be stalled, say half way, between any of these points there would be a delay of at least half hour or more before a member of the train crew could reach one of the points and get into communication and return to the train. By having the instruments with the pole and hooks communication may be obtained with the Despatcher at any time from anywhere.

I have here a photograph of a message that was received in St. Catherines from Toronto on Aug. 28, 1848. I sent a copy of this to the Secretary of the Old Time Telegraphers and Historical Association. He advised me that, in so far as he was aware, it was older than any message in their collection.

The tariff prices from St. Catherines to Toronto, Hamilton and other similar points was one and three pence, to Buffalo, one and ten pence. Later on our Agent at St. Catherines sent me a photographic copy of a collection of old telegrams, and one of them from London, Ont. to St. Catherines was dated November 8th., 1847. On October 8th. 1847 the first telegram was sent between Toronto and Montreal. I have only one copy of this photograph, but if anyone would like to see it after the meeting I will show it to you.

Chairman.— This paper has been very interesting and is now open for discussion. I see we have Mr. Harold with us.

Mr. L. Harold.—

Mr. Chairman and gentlemen, I did not come here tonight to speak. I came to listen. I am just a baby in this club, and such being the case I ought to be seen but not heard. However, I have a worthy gentleman beside me. Mr. Hulatt, Superintendent of Telegraphs of the Grand Trunk. He will probably have a few words to say if you will call upon him.

Chairman.—

We shall be very pleased to hear from Mr. Hulatt. I might say that Mr. Hulatt is also Chairman of the Telegraph and Telephone Section of the American Railway Association.

H. Hulatt.—

I am sure we have all heard with considerable interst the paper by Mr. Camp in which he so ably outlined the advantages of Telephone train despatching as compared with the older method of Telegraph train despatching. I note in his paper he rather lays emphasis on the fact that Telephone train despatching was adopted by railroads due to a labor condition. This may have been the case, but, personally, would not like the impression left with the meeting that the Telegraph Departments of the railroads have to wait such emergencies before inaugurating new practices. I think we can truthfully say Telephone train despatching was adopted by the majority of roads after its first experimental installation because of its improved efficiency and economy as compared with Telegraph train despatching.

When first inaugurated, many despatchers figured they were going to lose their jobs, whereas hardly any were disturbed, and once the greater majority of despatchers have become accustomed to despatching trains by Telephone they would be extremely loath to return to Telegraph train despatching

Mr. Camp in his paper does not indicate what important developments resulted in Railway Telegraph Departments as a consequence of the adoption of Telephone train despatching, and possibly Mr. Camp and the meeting will pardon me if I proceed to indicate such developments.

One of the first outcomes as a result of the installation of Telephone train despatching circuits was as to whether or not such circuits could simultaneously be utilized in other directions, thus bringing into being what is known as a simplex panel, which permits the same pair of wires being operated by Telegraph at the same time as they are being operated as Telephone circuits without interference between the two types of communication.

While it is the practice of all railroads to endeavour to restrict the traffic of Telephone train despatching circuits to exclusively despatching matters, the value of such circuits in the case of emergencies to the Operating Department people brought before the railroads the advantage of having their own private long distance telephone circuits for ordinary conversation with the result that a very large number of roads have such circuits in service, which permits close personal connection being maintained between all principal officers and their subordinates. In this connection it may be of interest to know that the Grand Trunk has today its own private long distance telephone circuit between Montreal and Ottawa, and also between Buffalo and Niagara Falls; both circuits being simplexed so as to permit of simultaneous telegraph operation. Later on when financial conditions warrant, the hope is, that such circuits will be erected over the entire main line from Montreal to Chicago. The erection of such circuits on pole lines also carrying Telephone train despatching circuits has permitted such circuits to be what is known as phantomed, thereby affording an additional telephone circuit.

It may also interest the meeting to know what has developed in the matter of Wireless Telegraphy and Telephony in so far as its application to railroad use is concerned. Once

again, I am proud to say that the first experiment in connection with the transmission of Wireless signals from a fixed point to a moving train, took place on the Grand Trunk railroad from St. Dominique Station, Quebec, under date October 13th., 1902, that is to say, within seven years from the time that Marconi found he could telegraph without wires by Hertzian waves a distance of one mile. The experiment on the Grand Trunk took place during the passage of a special train between Toronto and Montreal, bearing the members of the American Association of General Passenger and Ticket Agents. It was demonstrated that communication could be maintained though no attempt was made to cover distances comparable in size by those then attained by Marconi and others, but with comparatively simple laboratory apparatus it was possible to keep the train in touch with the station for from eight to ten miles. This experiment was carried out under the direction of Sir Ernest Rutherford, F. R. S. C., and Dr. Howard T. Barnes, F. R. S. C. , then both of the MacDonald Physical Laboratory of McGill University, Montreal.

In 1909 the Lackawanna Railway Company first made experiments with Wireless Telegraph and Telephones, but the apparatus at that time was not sufficiently developed to be of practical use, but during the early part of 1913 towers were erected and Wireless Telegraph stations installed at Scranton and Binghampton, and it was found that the service between these points was equally as satisfactory as the Morse Telegraph and could be relied upon when the Telegraph and Telephone service was impaired. Their first passenger train was equipped with Wireless Telegraphy and messages transmitted to and from the train and fixed stations at Scranton and Binghampton on November 21st., 1913. By November 1915 they had four stations equipped with Marconi apparatus and two of their limited trains. Since that time there have been large developments in Wireless Telephony and probably that is the branch of Wireless work which will ultimately prove of the most value in railroad work.

The greatest aid, probably, in Wireless Telephony, has been the developed of what is known as the "French" or "Thermionic" valve. A small piece of apparatus somewhat similar to an ordinary electric lamp, which however amplifies sound. One of these valves amplifies sound six times, two valves thirty six times, three valves two hundred and

sixteen times, and so on. I will leave it to some far more skillful mathematician than I in the audience, to determine what twenty valves would do. As a wireless man once said to me, provided you could get sufficient valves there doesn't seem to be any reason why you could not hear the angels singing. I think in connection with the transmission of Wireless Telegraphy signals from Carmarthen, Wales, to Australia, undertaken about a year and a half to two years ago, they utilized between twelve and fourteen valves.

One of the disadvantages of Wireless Telegraphy has been the faintness of the signals heard through the receiver necessitating slow transmission on the part of the operator. This condition has now not only been remedied by the valves mentioned previously, but also by relays invented which permit of the signals being copied on tape or relayed to an ordinary Telegraph sounder.

A further development which has come to the front and which, when fully developed, should prove of tremendous value to railroads by permitting a much greater utilization of existing plant, is, what is known as the "Wireless Carrier System." Without going into technical details such System permits of any number of conversations being carried on over one circuit without interference. Major General Squiers of the United States Army has experimented largely in this field and possibly to him is due the most credit for having developed it to its present state.

Recently on the Putnam division of the New York Central railroad, an experiment was carried on by Major General Squiers whereby on a section of the New York Central long distance Telephone circuit between New York and Chicago, while such circuit was in usual operation, also while being operated as simpleved Telegraph circuit and phantomed, several conversations were superimposed on the circuit without interference to its legitimate use. I do not think the superimposed conversations were right up to what is known as commercial standard, but in the course of time such a result will undoubtedly be attained. My information is that the Bell Telephone Company of Canada and also the American Telegraph and Telephone Company in the United States are utilizing with success Wireless Carrier circuits.

Another development in communication service of recent years has been what is known as the Printer Telegraphs whereby fast speed in transmission can be handled by non-

telegraphers by means of a typewriter keyboard. This apparatus is largely used in connection with the transmission of commercial messages both by the Canadian Pacific Railway and Canadian National Telegraphs and on many of the railroads in the United States is used for the exclusive transmission of railroad traffic.

I think the few remarks I have made, coupled with Mr. Camp's most interesting paper will indicate the tremendous developments that have taken place in railroad Telegraph and Telephone work during the last ten or twelve years. I can only say the brains and energies of all members of such Departments are concentrated in solving problems which will tend to increase the use to which existing facilities can be put without incurring additional heavy capital expenditures.

Chairman.—

This is all very nice, and I am sure that having heard Mr. Hulatt's interesting talk some of us have some questions to ask.

Mr. G. M. Wilson.—

I have listened with much interest to Mr Camp's paper tonight in which he makes a comparison between the use of the Telegraph and the Telephone. He says that on account of the slower communication with the Telegraph, much of the personal element is absent. I do not think this is at all derogatory to the Telegraph, as I sometimes wish that much of the personal element in using the Telephone were absent (Laughter). While on my feet I might mention that I am looking for information. Sometime ago when in Chicago I called at the Blackstone Hotel to look over the power plant there which is located a story or so under the sidewalk. In going into the chief engineer's office I heard a ticking sound, and looking up I saw a hand writing on the wall. I confess this looked somewhat uncanny to me. The writing said, "The lock of room 57 requires to be repaired." On making enquiries as to what this device was called I was told it was a "telautograph." Perhaps Mr. Camp would be good enough to explain to us how this device works.

Mr. Norman Holland.—

Just while Mr. Camp is thinking up a reply to that question about the Telautograph, it may interest you to know of a trip which I took to the Old Country last Spring I had a letter of introduction from Mr. A. H. Morse, General Manager of the Marconi Wireless Telegraph Company, introducing me to their staff on the boat. As a consequence I spent considerable time in the wireless room. It was extremely interesting watching their uses of the various instruments which they now have on a modern liner. They have one known as a Direction Finder. By means of this they can locate their position to within a fraction of a degree. The Thermionic Valve of which Mr. Hulatt spoke, has revolutionized wireless telegraphy. The Valve is in the form of a small light. We experimented using one, two and three lights and it was most interesting to notice the enormous multiplication of the sound when you get up to three lights. Three lights are used on the modern sets.

Coming back on the Empress of Britain, which has an extremely large set, we had the pleasure of "listening in" on a wireless telephone conversation between the Chief Engineers of two of the big Cunard liners. One engineer, evidently the other chap's superior, was giving him the devil for some trouble he was having with one of his boilers. The nearest liner was more than 390 miles away from us. Although you missed a word here and there it was astonishing how much of the conversation you could hear.

Mr. O. Masse.—

Mr. Chairman and gentlemen, there is not much left for me to say, having been preceded by so many learned members, but just briefly I wish to say that I found Mr. Camp's paper very interesting. I was not living at the time they used signal fires, but I was living at the time they drew the boughs away from the telegraph wires, and am familiar with them as they are the kind my father used to use on my back 25 years ago. The paper says that once a system was tried whereby they used 24 wires, one wire for each letter of the alphabet. If one operator had to take care of 24 wires he would have my sympathy, as we can hardly take care of one wire today. I would like to see a man working on 24 wires—he would no last long. I was not aware until to-

night that in 1839 the receiving operators used to take the signals through their thumbs and fingers, and I think I know now why they are called "old timers." It is because they have the "feeling" system. But this has all disappeared today in the younger element with the use of the telephone. From a train despatcher's point of view I find that the telephone is a great time saver, more particularly when the Despatcher has to get into communication with a Conductor or Engineer or other employee concerned. Train orders can be issued 50 per cent. faster than with the telegraph system and just as accurately. Mr. Hulatt referred to the use of the telephone for tracing cars, lost umbrellas and parcels. I quite agree with him. We discourage the use of the telephone except for train work unless it a very important matter. I notice Mr. Camp states that the telephone is more efficient inasmuch as the Despatcher is able to raise the Operator if he should be in another room, or outside on the platform, or away from the instrument. I do not altogether like this as I am afraid Mr. Camp wants to imply that the operator might be asleep. We try to keep them awake and have very little trouble. On the whole the Telephone is 50 per cent. better than the Telegraph. I thank you for your attention.

Mr. W. T. Hawes.—

Mr. Chairman, furthering this interesting discussion on the wireless telephone, I should like to extend an invitation to any of the gentlemen present to listen in on some of the wireless systems. There is one every Tuesday evening, and if any gentleman here would like to come we will be glad to grant him every facility to look into the system. Just phone Uptown 9122. We received advice from a young fellow in Charlottetown, P. E. I., who claimed he had heard one of our concerts. I should like to extend this invitation to some of the gentlemen to come along.

Chairman.—

Thank you. If there is any further discussion on this subject we shall be glad to hear it.

Mr. W. J. Camp.—

Before we adjourn I would like to make a few

remarks in answer to the questions that have been raised in the discussion. Regarding Mr. Hulatt's remarks, I might say that the addition of the simplex to train despatching circuits was a later development. It was first used by the New York Central and afterwards by the Canadian Pacific for operating the selective calling instruments. The Burlington Railway bridged the two wires for the calling device and that system is now universal throughout the continent, and wherever an additional telegraph circuit is required the telephone circuit is simplexed. All our telephone circuits from St. John, N. B. to Vancouver are simplexed for telegraph work and most of our branch line circuits are also simplexed but there are several where there is nothing gained because on a despatching circuit, say, between here and Mont Laurier there is not sufficient telegraph business to warrant an additional telegraph circuit. That circuit is combined with one to Ottawa on the North Shore, but we could only simplex the latter part. The addition of simplexing circuits in this way results in reducing the expense of installing the telephone because if another telegraph wire is required, by adding one more wire we get the telephone circuit as well as another telegraph wire. One great drawback is that the telephone circuit requires copper wire of No. 9 B. & S. gauge, and the old telegraph despatching circuit was usually No. 9 iron wire The cost of the telephone wires as compared with the telegraph was therefore about five times greater, and the cost of the station equipment was about eight times, but having in mind that we could obtain an additional telegraph wire, thus dividing up the cost, it became an important factor in the development of the system. I made no mention in the paper about the message circuits as I did not want to make the paper too long, and the subject given me was to consist of a comparison between the telegraph and telephone for train despatching. W have used telephone circuits on the Canadian Pacific Railway for a good many years for message work between Montreal and North Bay. We established the telephone circuit between Montreal and North Bay by compositing two telegraph wires. We also had it between North Bay and White River, and between Montreal and Toronto for use of the ticket offices, but they have been abandoned for the reason that between Montreal and Toronto we found that we could not quadruplex those telegraph wires but could only duplex, and between here and North Bay it interfered with the Commercial through circuits and was

finally dropped, but we are still using the composite telegraph-telephone circuits between Montreal and Ottawa and Montreal and Farnham.

The New York Central has gone ahead of all other roads in the use of telephone message circuits. There will be read before the meeting, which is to be held in Cleveland of the Telegraph and Telephone section of the American Railway Association, a paper by an engineer of the New York Central giving complete details of their system. This paper has 98 pages, but as my time was rather limited I do not feel like stealing any of his "thunder." It is only on systems where they have a very large volume of traffic between comparatively short distances that, at the present time, I think it will be an advantage to have a system such as used by the New York Central, but between New York and Chicago there is certainly a vast amount of communication between the officers of that company, and while there are no similar conditions prevailing on Canadian lines I have no doubt that before long the Canadian Pacific will fall in line with the other roads.

As has already been mentioned, where you install a telephone circuit there is a tendency on the part of everyone to use it and unless proper supervision is exercised your line may become useless for the purpose for which it was originally intended.

Mr. Hulatt spoke of Mr. Rutherford and his experiments on the Grand Trunk. Mr. Rutherford was one of the earliest experimenters in wireless telegraphy. I might mention, however, that Mr. Foley had alsoexperimented with wireless apparatus and had made some tests on other lines a number of years before that mentioned by Mr. Hulatt.

Regarding the telautograph mentioned by Mr. Wilson: That is only for short distances. The New York Central used it a few years ago at the Grand Central Station to permit of communication between various parts of the station and yards. It is hardly in my power to explain the details of the system satisfactorily to you, but it can be used only for short distances. It was also used in the Astor Hotel in New York. As soon as you entered the hotel and signed, it was signalled all over the hotel so that each employee knew your name and room number, but it does not seem to have been brought into general use although it has been on the market for a number of years.

Mr Masse spoke about the 24 wire system. If I remember rightly in reading up the history of this, each wire had a

small pith ball at the end, and by sending electric impulses over the wire each pith ball was operated.

Mr. Norman Holland.—

The Telautograph is used on every floor of the McAlpin Hotel. My reason on insisting on Mr. Camp answering the question, was that if he did not know just how it was operated I was going to tell you myself.

The main trouble with the Telautograph is that the operator who generally handles the master instrument writes such a poor hand that the reproduction on the various floors looks like a hen scratching. May I ask Mr. Camp if the rails have ever been used as a circuit.

Mr. W. J. Camp.—

Yes.—In the northern part of this continent we are at certain times affected by earth currents which occur simultaneously with brilliant displays of the aurora borealis, due, scientists think to sun-spots. Our wires running east and west become so badly affected that it is utterly impossible to operate them. We overcome this to some extent by connecting two wires together and making a metallic circuit. One of our men in the west conceived the idea that he could use the rail for a return and he connected up two or three wires, but when on one of my visits I found this arrangement I immediately ordered it stopped. All he had obtained was a connection to the earth and a very poor one at that as electrically the rail would not give a good connection. The rail is, however, used in automatic signals at the present time. They take a section of a mile or a half a mile and insulate it from the next section. At one end of the section they connect the two rails with batteries, and at the other end they put a receiving instrument like a telegraph sounder or relay The battery power at one end operates through the rails and the instruments operate the signals. A railway train or an iron bar placed across the rails causes a short circuit and cuts off the battery releasing the receiving instrument and throws the signal to clear if everything is all right ahead. The normal position is "danger." The rail is used in practically all automatic signals at the present time.

Mr. R. MacVicar.—

We are very much interested in this very able paper, and while we cannot all grasp the technical details

we must marvel at what has been accomplished.

I move a hearty vote of thanks to Mr. Camp for his interesting paper.

Mr. G. M. Wilson.—

I take pleasure in seconding that.

The motion was put to the meeting and carried amidst applause.

The Chairman then formally conveyed the appreciation and thanks of the members to Mr. Camp, and announced that the subject of the paper for next meeting in October would be "Corrosion" by Dr Cushman of Washington, D. C. He also announced that the usual refreshments in the form of coffee and sandwiches would be served in an adjoining room and invited all those present to stay and partake of them. The meeting then adjourned.

W. D. HANNAH
DIED
JULY 1st 1921

W. S. TILSON
DIED
AUGUST 2nd 1921

If you appreciate the value of membership in our CLUB will you not urge some of your friends to share its privileges?

In this issue will be found a blank application form which it is intended will be used in the drive for increased membership.

INDEX OF PAPERS AND THEIR AUTHORS
Presented Before Railway Clubs During the Season of 1920-1921
Compiled by the Society of Railway Club Secretaries

Harry D. Vought, Room 315, 26 Cortlandt St., New York City Secy.

NEW YORK RAILROAD CLUB

September 17, 1920.—"Standards Established by the Association of Railroad Executives" By Mr. A. J. Miller, Chairman New York Committee on Car Service, Mr J. W. Meredith, General Superintendent C. R. R. of N. J., Mr. J. C. Fritts, M. C. B., D. L. & W. R. R., Mr. P. H. Hardin Chief Eng., Motive Power, N. Y. C. R. R., Mr. Dexter C. Buell, Director, Railway Educational Bureau, Omaha, Neb.

October 15, 1920.—"The Human Element in Railroading." By Mr. William S. Wollner, General Safety, Fire Prevention and Welfare Agent,, Northwestern Pacific Ry., San Francisco, Cal., Mr. J. C. Clark, Assistant to General Manager Safety Work, Oregon Short Line, Salt Lake City, Utah., Mr. Alexander S. S. Lyman, General Attorney, N. Y C. R. R., Mr. Robert M. Forrester, President, Accounting Department, Employees Association, Erie R. R.

November 19, 1920.—"Loss and Damage to Freight." By Mr. H. H. Shepard, General Superintendent, D. L. & W. R R., Mr. Thomas C. Smith, Freight Claim Agent, C. R. R. of N. J., Mr. Alexander S Lyman, General Attorney, N. Y. C. R. R., Mr. F. S. Gallagher, Engineer of Rolling Stock, N Y. C. R. R., Mr. W. J. Edwards, Manager Trunk Line Inspection Bureau.

December 16, 1920.—No paper.

January 21, 1921.—"The Railway Problem." By Mr. Samuel O. Dunn, Editor, Railway Age.

February 18, 1921.—"The Transportation Problem of the Metropolitan District." By Mr. John J. Mantell, Regional Manager, Erie R. R.

March 18, 1921.—"Safety of Passengers in Steel Cars." By Frank M. Brinkerhoff.

April 15, 1921.—"Railroad Conditions in Foreign Countries." By Mr. David Van Alstyne, American Locomotive Co., Mr. F. H. Shepard, Director, Heavy Traction, Westinghouse E. & M. Co.

May 20, 1921.—"Vitalizing Locomotives." By Mr. George M. Basford.

CENTRAL RAILWAY CLUB

Harry D. Vought, 26 Cortlandt St., New York City, Secretary

September 10, 1920.—"The Upkeep of Freight Car Equipment." By Mr. J. W. Senger, Superintendent, Rolling Stock, N. Y. C. R. R., Cleveland.

November 11, 1920.—"Engine House Organization." By Mr. E. R. Webb, M. M., M C. R. R., St. Thomas, Ont.

January 13, 1921.—Moving Pictures and Address by Mr. A. H. Ehle, General Sales Manager, Baldwin Loco. Works.

March 10, 1921.—"Modern Engine Terminals and Repair Shops." By Mr. H. E. Stitt, Chief Eng., The Austin Co., Cleveland, O

May 12, 1921.—"The Manufacture of High Speed Steel." By Mr. Felix Kremp, Metallurgist, Atlas Crucible Steel Co., Dunkirk, N. Y.

WESTERN RAILWAY CLUB

Bruce V. Crandall, Secy., 1824 Tylton Building, 14 E. Jackson Boulevard, Chicago, Ill.

September, 1920.—"The New Order of Things in the Railway World." By L. C. Fritch, Vice-President C. R. I. & P. Ry.
Motion Pictures. "The Building of a Locomotive in the Plant of the Baldwin Locomotive Works." Address by Samuel M Vauclain, Vice-President, The Baldwin Locomotive Works.

Canadian Railway Club

October, 1920.—"We have the Public's Confidence." By A. W. Towsley, Assistant to Vice-President & G. M., C. R. I. & P. Ry. "The Public's Faith in the Railroad Men." By F. H. Hammill, Assistant G. M., C. & N. W. Ry.

November, 1920.—"A. R. A. Campaign for Prevention of Freight Loss and Damage." By C. H. Dietrich, Freight Claim Agent, C. M. & St. P. Ry.

December, 1920.—"Relation of Foundation Brake Rigging to Air Brake Equipment Maintenance." By H. A. Burson, Chief Air Brake Inspector, Pennsylvania System.
Motion Pictures "The Building of the Brake Beam from Raw Material to Finished Product." By the Chicago Railway Equipment Co.

January, 1921.—"Cause of the Present Condition of Freight Cars and Suggestions for Their Improvement." By J. C. Fritts, M. C. B., D. L. & W. R. R.

February, 1921.—"The Foreman." By G. M. Basford.
Motion Pictures "For the Good of the Commonwealth." Address By Clarence H. Howard, President, Commonwealth Steel Co.

March, 1921.—"Electrical Development and Standards in the Power and Lighting Field." By J. E. Gardner, Electrical Engineer, C. B. & Q. R. R.

April, 1921.—"Locomotive Terminal and Motive Power Management." By L. G. Plant, Associate Editor, Railway Review.

NEW ENGLAND RAILROAD CLUB

Wm. E. Cade, Jr. 683 Atlantic Ave., Boston, Mass. Secretary.

October 19, 1920.—"The Recent Increase in Passenger and Freight Rates and Its Relation to the Public." By Gerrit Fort, Vice-President, Boston & Maine R. R.

November 9, 1920.—"The Locomotive Terminal as an Operating Factor." By L. G. Plant, Associate Editor, Railway Age.

December 14, 1920.—"Some Phases of Railway Operation in Canada." By Grant Hall, Vice-President, C. P. Ry.

January 11, 1921.—"Service of Supply." By H. C. Pearce, General Purchasing Agent Seaboard Air Line.. "Problem of Handling Material and Freight on Railroads." By Charles N Winter, Associate Editor, Railway Age.

March 8, 1921.—Thirty-eighth Annual Meeting. Election of Officers and Reports. "Freight Claims. Their Cause and Prevention." By Charles M. MacDonald, Freight Claim Agent, Boston & Maine R. R.

May 10, 1921.—"New England, Its Lakes, Mountains and Rivers." By Eugene N. Jones, Official Photographer, Boston & Maine R. R. .....

ST. LOUIS RAILWAY CLUB

B. W. Frauenthal, Drawer 24, M. & P. O., St Louis, Mo. Sec-Treas.

May 28, 1920.—Unveiling of Memorial Tablet at Railroad Y. M. C. A. Addresses by Judge D. P. Dyer, Col. A. T. Perkins, L. G. Scott and G. V. R. Mechin.

June, July, August, 1920.—"The Revenue Needs of the Railroads," by Mr. Howard Elliott, Chairman General Rate Committee Association of Railway Executives, N. Y.

September 23, 1920.—"Manganese Construction in Track Work," by Mr. J B. Strong, Chairman Standardization Committee, Manganese Track Society, Hilburn, N. Y, by Mr. Earl Stimson, Chief Engineer Maintenance, B. & O. R. R., Baltimore, Md. ..

October 8, 1920.—"Central Western Manufacturing Industry in Relation to Transportation Conditions," by Mr. R. D. Sangster, Industrial Commissioner, Chamber of Commerce, St. Louis. ..

November 8, 1920. — "Informal Remarks on Railroad Situation," by Mr. Samuel O. Dunn, Editor Railway Age, Chicago, Ill., and "Midvale-Cambria Steel Industry," by Mr. George A. Richardson, Special Engineer, Philadelphia, Pa.

December 13, 1920.—"Steel, the Giant Industry," by Mr. Geo. A. Richardson, Special Engineer of the Midvale Steel and Ordnance Company and Cambria Steel Company, Philadelphia. Pa. .....

January 14, 1920.—"Educating the Apprentice," by Prof. Lewis Gustafson, Superintendent The David Rankin, Jr., School of Mechanical Trades, St. Louis, Mo., and "The Observation Platform," by Prof. F. W. Shipley, Washington University, St. Louis, Mo.

Vice-Chairman, Railway Board of Adjustment No 1, U. S. Railroad Administration.

January 27, 1921.—"Railroad Accounting." By J. W. Orr, Comptroller of the Pennsylvania System.

February 24, 1921.—"Something of the Railroads in Pittsburg. By John B. Cowan, Publicity Manager of the Chamber of Commerce, Pittsburg.

March 24, 1921.—"The Maintenance of Equipment Departments—American Railways." By Col. H. H. Maxfield, Gen. S. M. P. Central Region, Pennsylvania System.

April 29, 1921.—"Modern Signalling." By A. H. Rugg, Chief Signal Engineer, Pennsylvania System, Philadelphia, Pa.

May 25, 1921.—"Government—Patriotism and Duty." By Judge Joseph Buffington, U. S. Circuit Court.

September 16, 1920.—"Superheating and Modernizing Locomotives." By Mr. C. M. Darden, of N. C. & St. L. Ry., Nashville, Tenn.

November 16, 1920.—"Ferrous Casting For Railway Use." By Mr. George V. Martin, National Malleable Castings Company, Washington, D. C.

January 20, 1921.—"Dispatching Trains By Telephone." By Mr. W. P. Cline, Atlantic Coast Line Ry., Augusta, Ga.

March 17, 1921.—"Electric Welding." By Mr. C. L. Jones, of the Westinghouse Air Brake Co., Atlanta, Ga.

May 19, 1921.—"Hand Brakes." By Mr. Frank N. Grigg, of the National Car Equipment Company, Washington, D. C.

May 11, 1920.—Annual Meeting.

September 14, 1920.—"Car Records and Their Relationship to Transportation." By Mr. J. A. Altimas, Assistant General Superintendent of Car Service, Canadian Pacific Railway, Montreal.

October 12, 1920.—"Patents of Invention." Br. Mr. William McFeat, Montreal.

November 9, 1920.—"How to Heat Railway Buildings Economically." By Mr. R. H. Black, Engineer of Power Plant Construction, Grand Trunk Ry., Montreal.

December 14, 1920.—"The Everyday Duties of a Roadmaster." By Mr. R. E. Keough, Assistant Engineer, Maintenance of Way, C. P. Ry., Montreal.

January 11, 1921.—"Operating Broad Gauge Railways in France Under War Conditions." By Captain A. H. Kendall, Now Master Mechanic, C. P. R. Ry., Montreal.

February 8, 1921.—..Some Engineering Features of Tramway Operation." By Mr. D. E. Blair, Superintendent Rolling Stock, Montreal Tramways Co., Montreal.

March 8, 1921.—"Repairs or Maintenance of Steel Freight Cars." By Mr. Samuel Lynn, M. C. B. P. & L. E. R. R., McKees Rocks, Pa.

April 12, 1921.—"Some Sidelights on Railway Time Tables." By Mr. A. Hatton, General Superintendent Transportation, C. P. Ry., Montreal.

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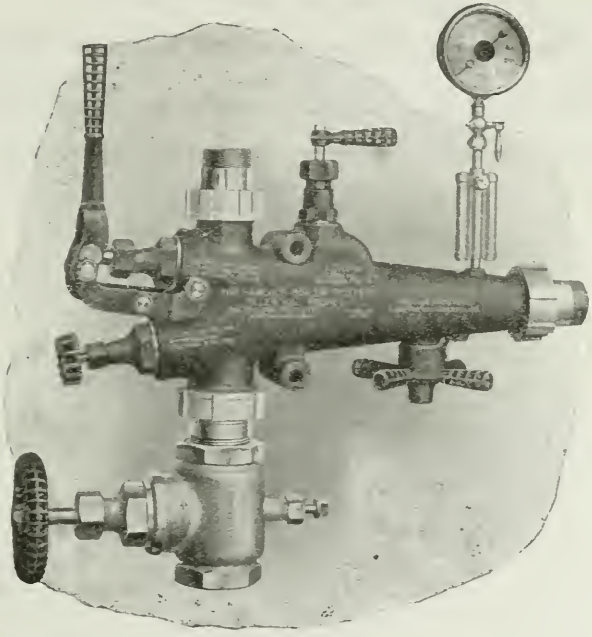

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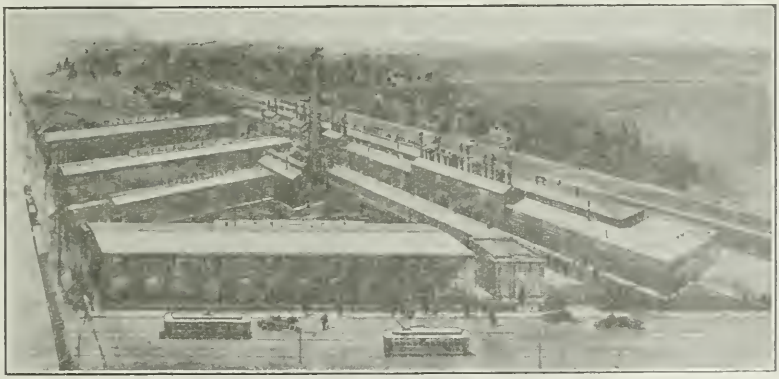

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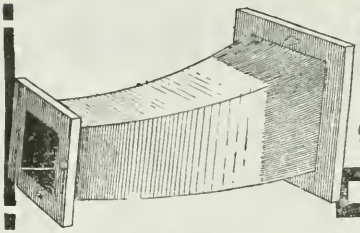

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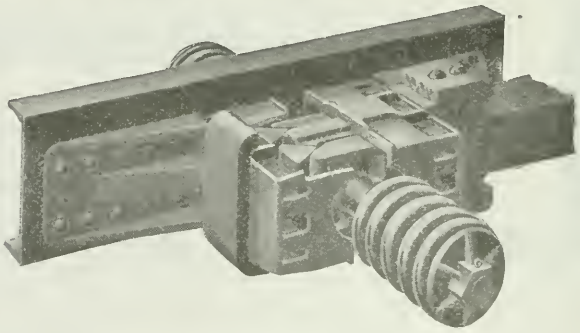

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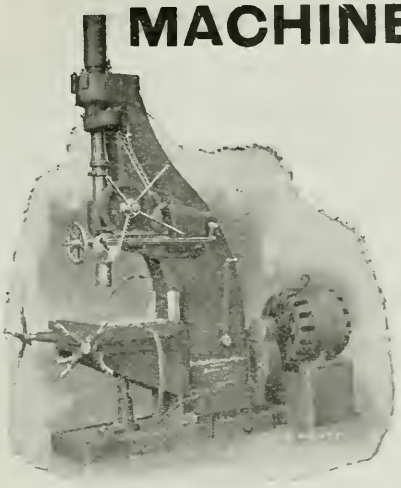

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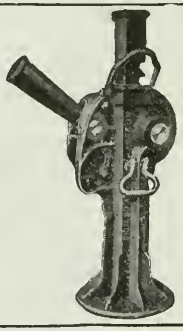

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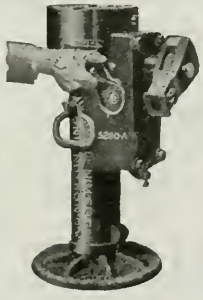

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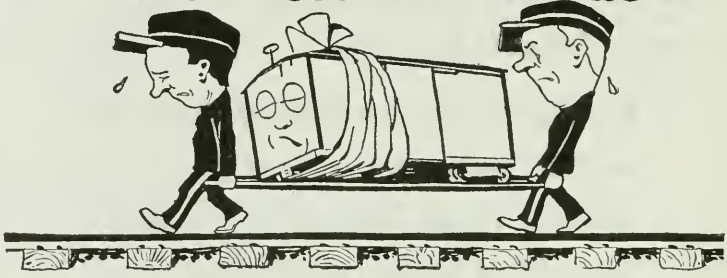

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COUPLERS

ETC.

Transportation Building - - Montreal

THE PRATT & LETCHWORTH CO., LIMITED

High Grade

MALLEABLE CASTINGS

Transportation Building - Montreal

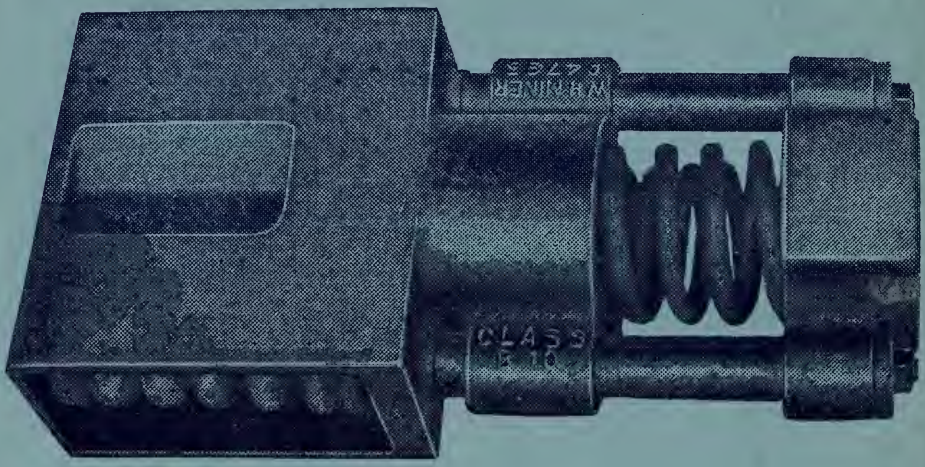
Works: BRANTFORD, ONTARIO

MINER

FRICTION BUFFER

CLASS B-10

MANUFACTURED IN CANADA



SAFETY AND COMFORT
SECURED BY USING THIS DEVICE.
IDEAL IN DESIGN AND ACTION

CANUCK SUPPLY CO. LIMITED

MONTREAL

W.H.MINER, CHICAGO.